Figure 1. Lexical structure tree of the phonetic symbol strings of

Zhu-Yin (BoPoMoFo) system.

5   Figure 2. Lexical structure tree of the phonetic symbol strings of
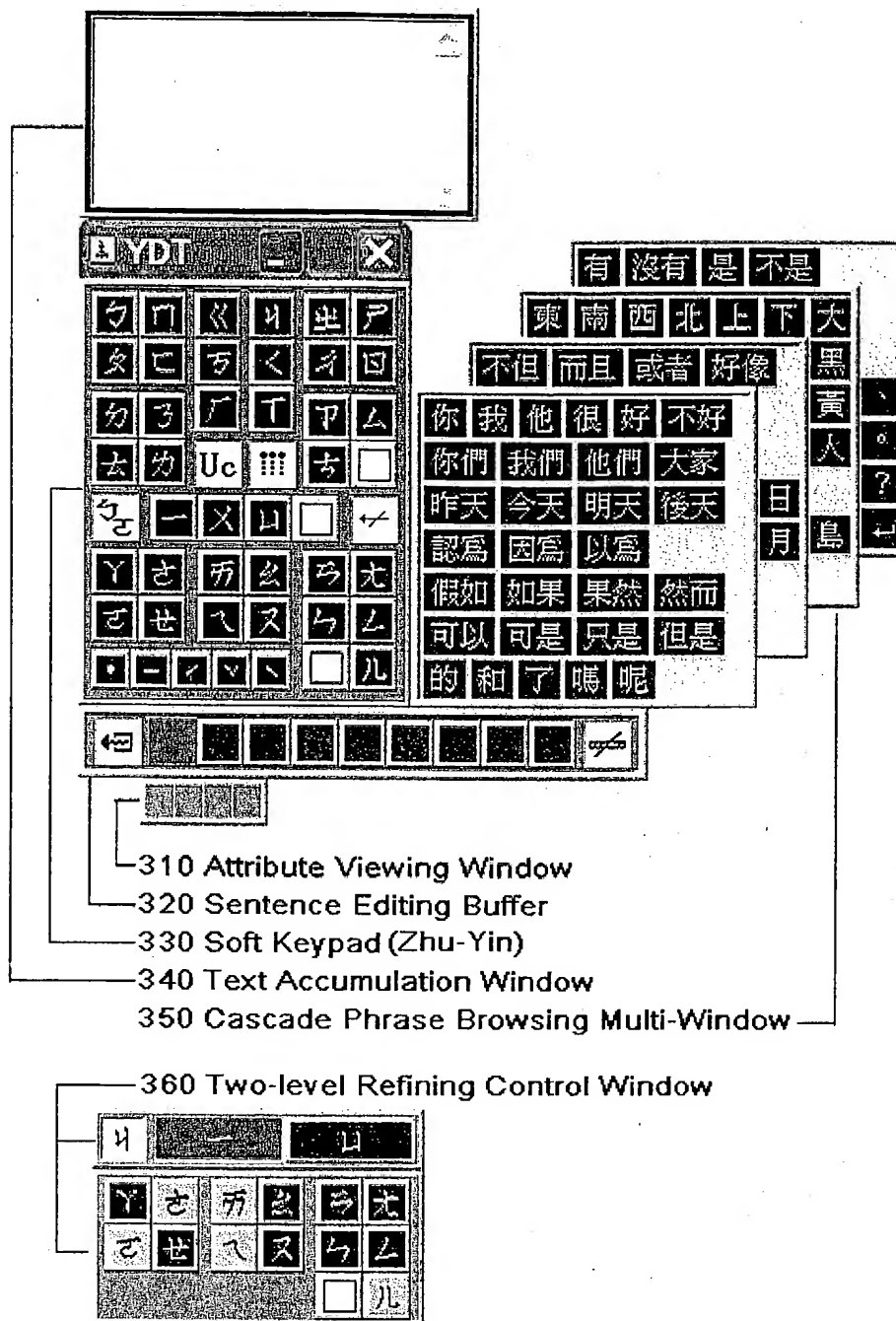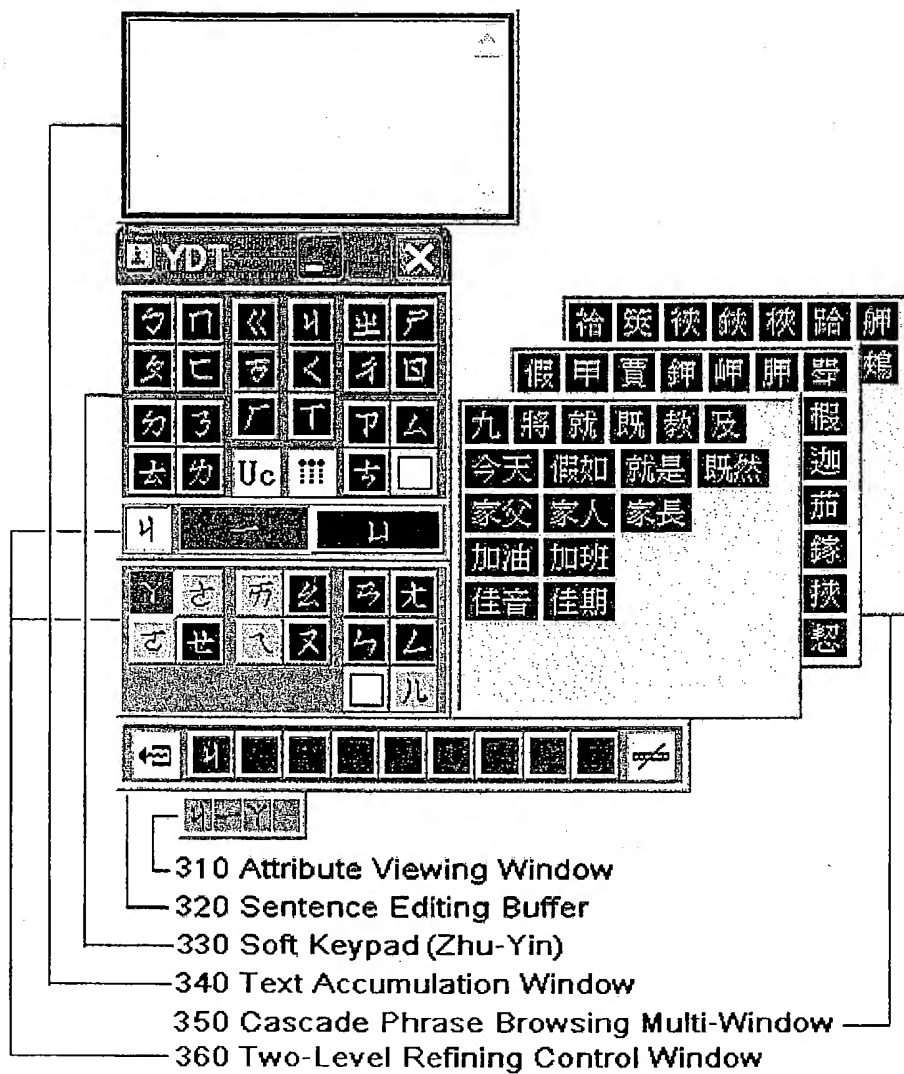
Pin-Yin system.

Figure 3. System components (Zhu-Yin system).

310 Attribute Viewing Window
320 Sentence Editing Buffer
330 Soft Keypad (Zhu-Yin)
340 Text Accumulation Window
350 Cascade Phrase Browsing Multi-Window
360 Two-level Refining Control Window

5

5   Figure 4. System components with window overlapping in actual use.

(Zhu-Yin system)

310 Attribute Viewing Window
320 Sentence Editing Buffer
330 Soft Keypad (Zhu-Yin)
340 Text Accumulation Window
350 Cascade Phrase Browsing Multi-Window
360 Two-Level Refining Control Window

65

510 Attribute Viewing Window
520 Sentence Editing Buffer
530 Soft Keypad(Pin-Yin)
540 Text Accumulation Window
550 Cascade Phrase Browsing Multi-Window
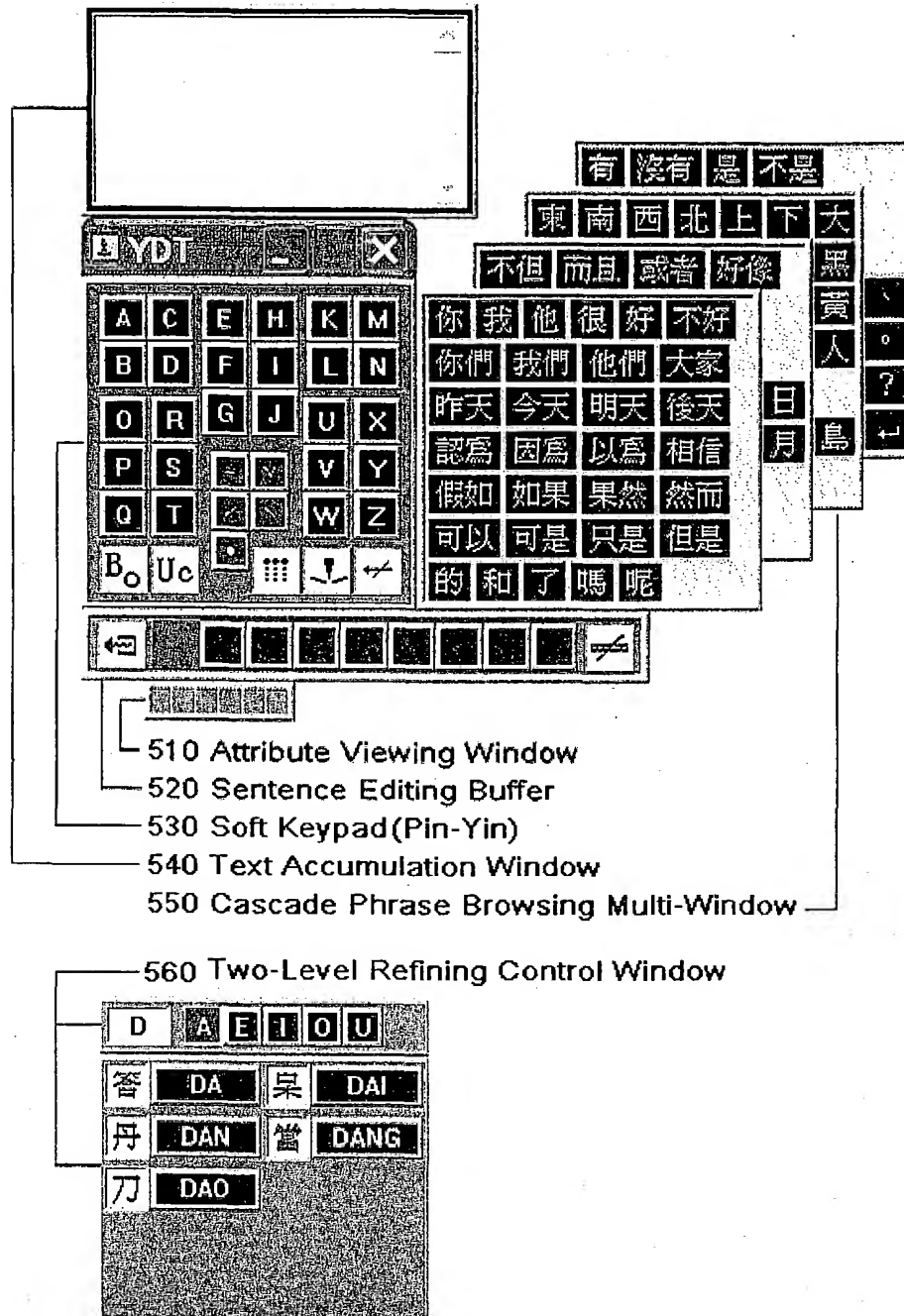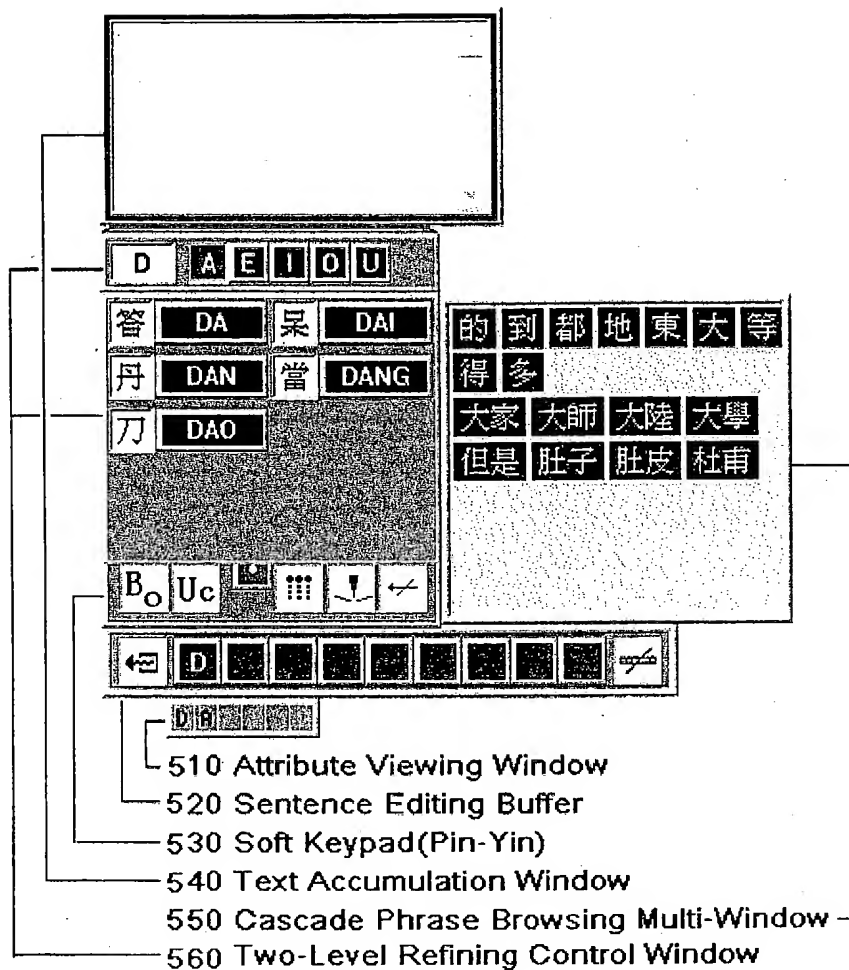560 Two-Level Refining Control Window

5

Figure 5. System components (Pin-Yin system).

Figure 6. System components with window overlapping in actual use.

(Pin-Yin system)

510 Attribute Viewing Window
520 Sentence Editing Buffer
530 Soft Keypad(Pin-Yin)
540 Text Accumulation Window
550 Cascade Phrase Browsing Multi-Window
560 Two-Level Refining Control Window

5

10

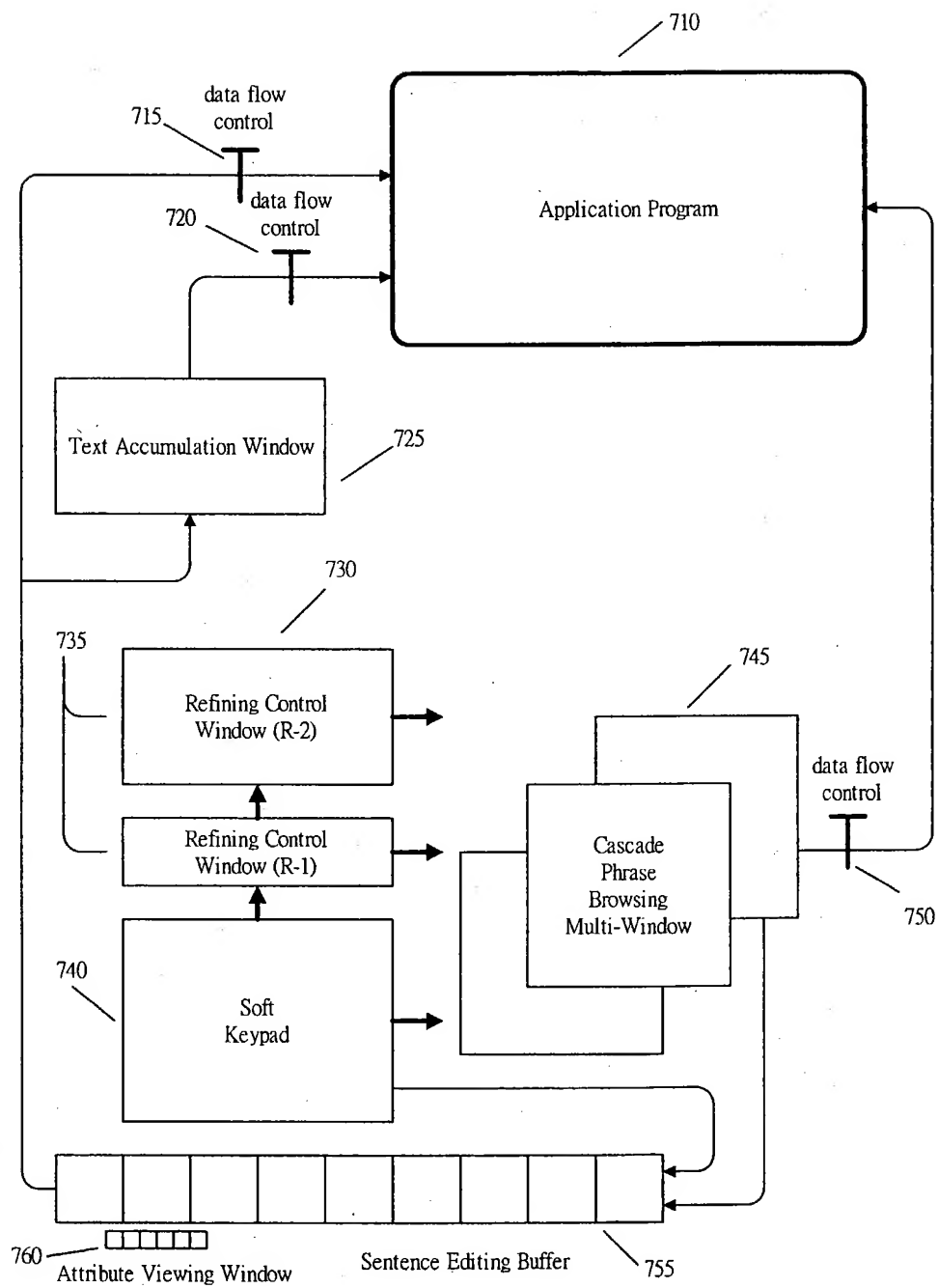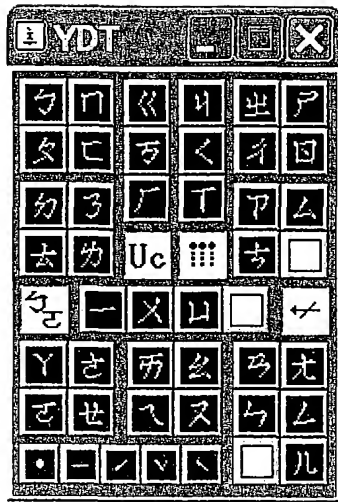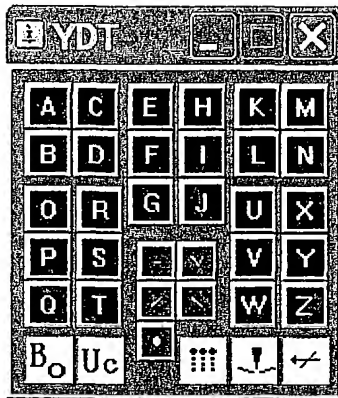Figure 7. Control paths and data flow.

5

5   Figure 8. Layout of the Zhu-Yin Keypad.

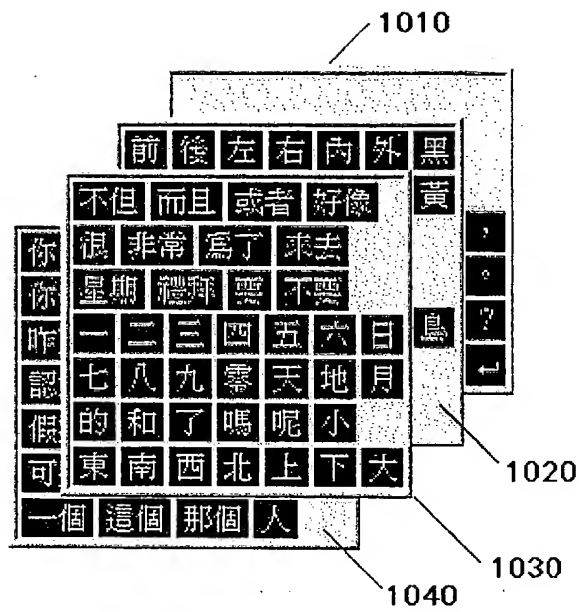10   Figure 9. Layout of the Pin-Yin Keypad.

Figure 10. Cascade Phrase Browsing Multi-Window.

phrase length	1	2	3	4	5	6	7	8	9
# phrases	100	50	30	20	20	10	10	10	10

5

Figure 11. The number of phrases that can be fitted into one window page

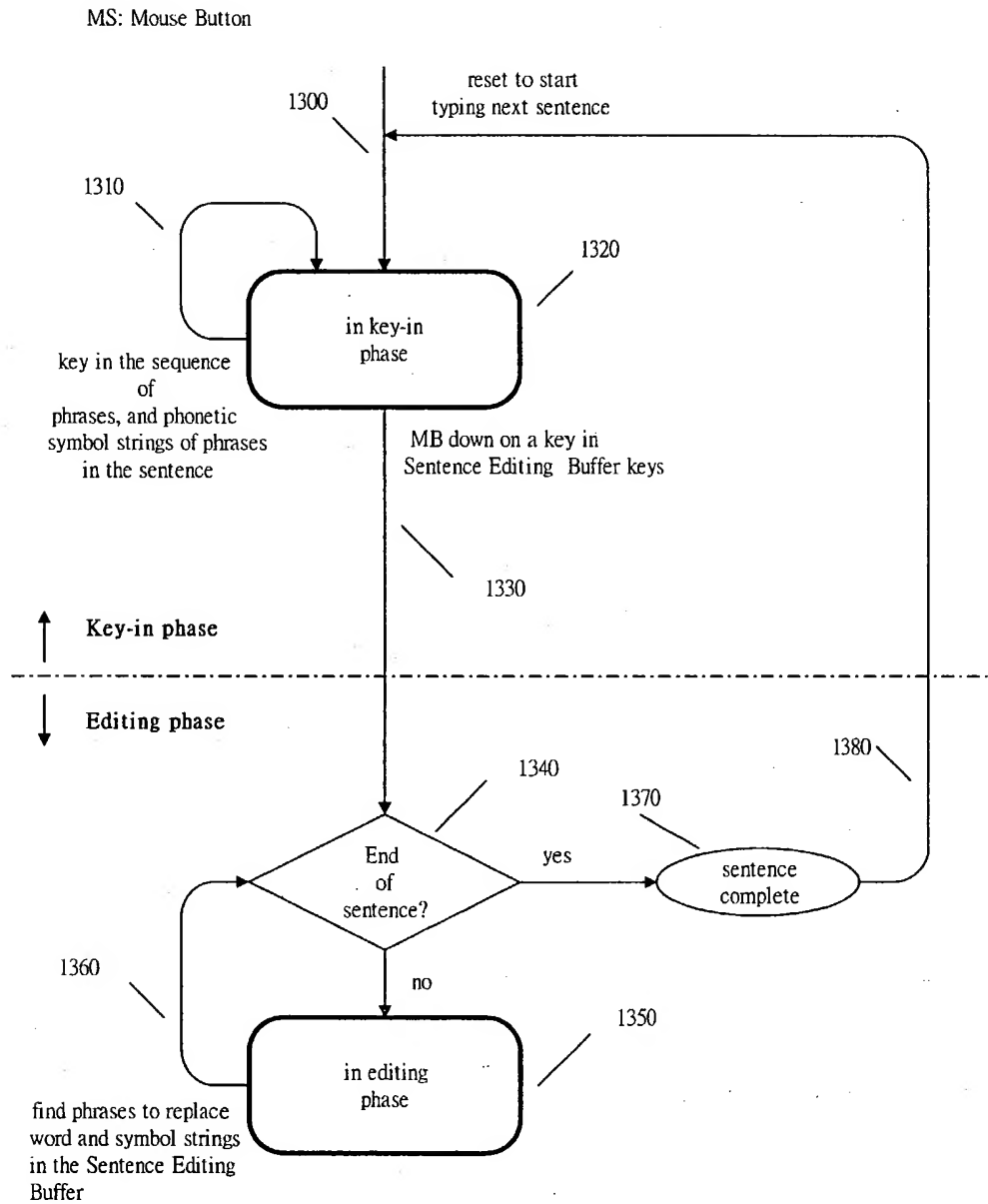of size equal to 10x10 words.

10

Figure 12. Sentence Editing Buffer.

MS: Mouse Button

reset to start
typing next sentence

1300

1310

in key-in
phase

1320

key in the sequence
of
phrases, and phonetic
symbol strings of phrases
in the sentence

MB down on a key in
Sentence Editing Buffer keys

1330

↑ Key-in phase

↓ Editing phase

1380

1340

1370

End
of
sentence?

yes

sentence
complete

1360

no

1350

in editing
phase

find phrases to replace
word and symbol strings
in the Sentence Editing
Buffer

5

Figure 13. Two-Phase Sentence Generation Procedure.

310 (510)
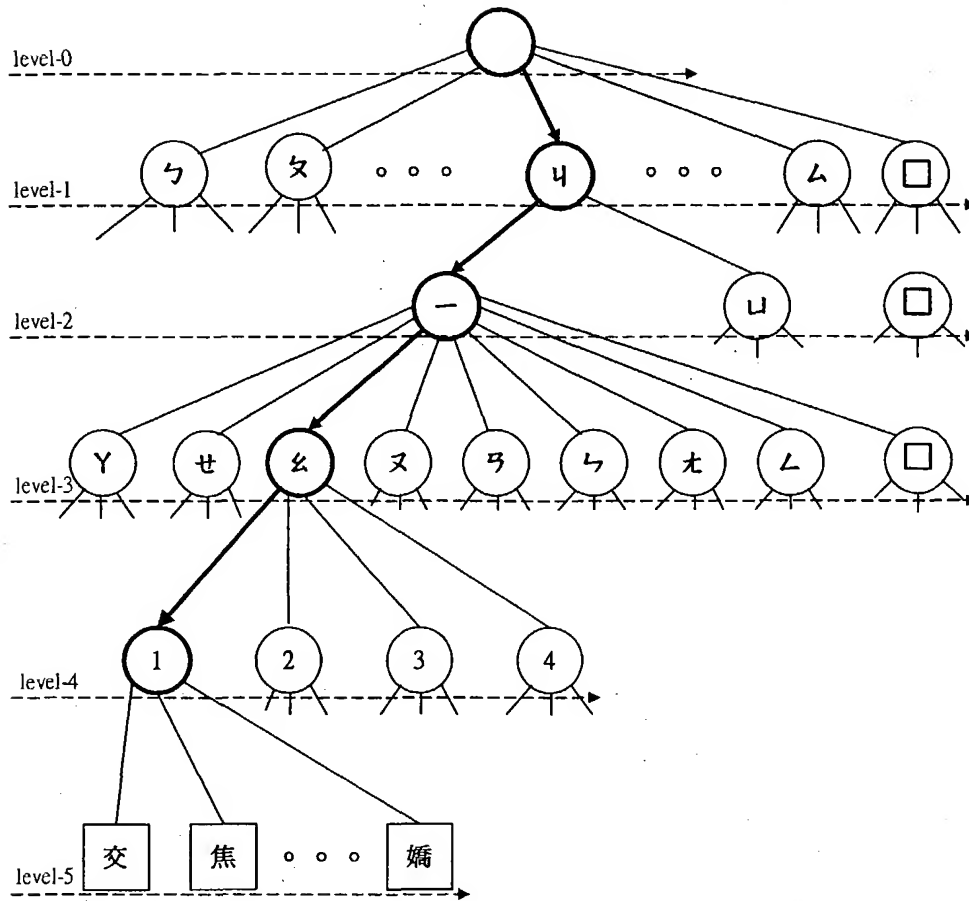

1410

Figure 14. Attribute Viewing Window.

340 (540)

Figure 15. Text Accumulation Window.

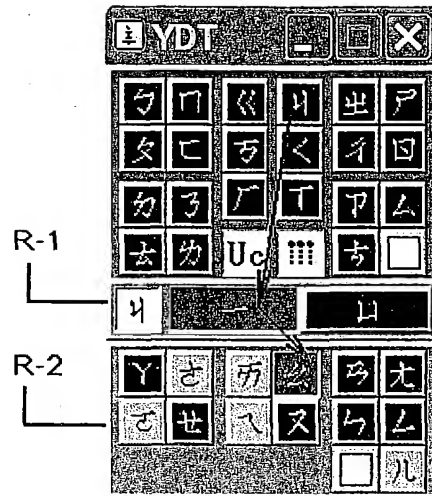Figure 16. Traversing on the Lexical Structure Tree.

(Zhu-Yin system)

5

10

Figure 17. Press-Touch-Release (PTR) operation on the Zhu-Yin Keypad
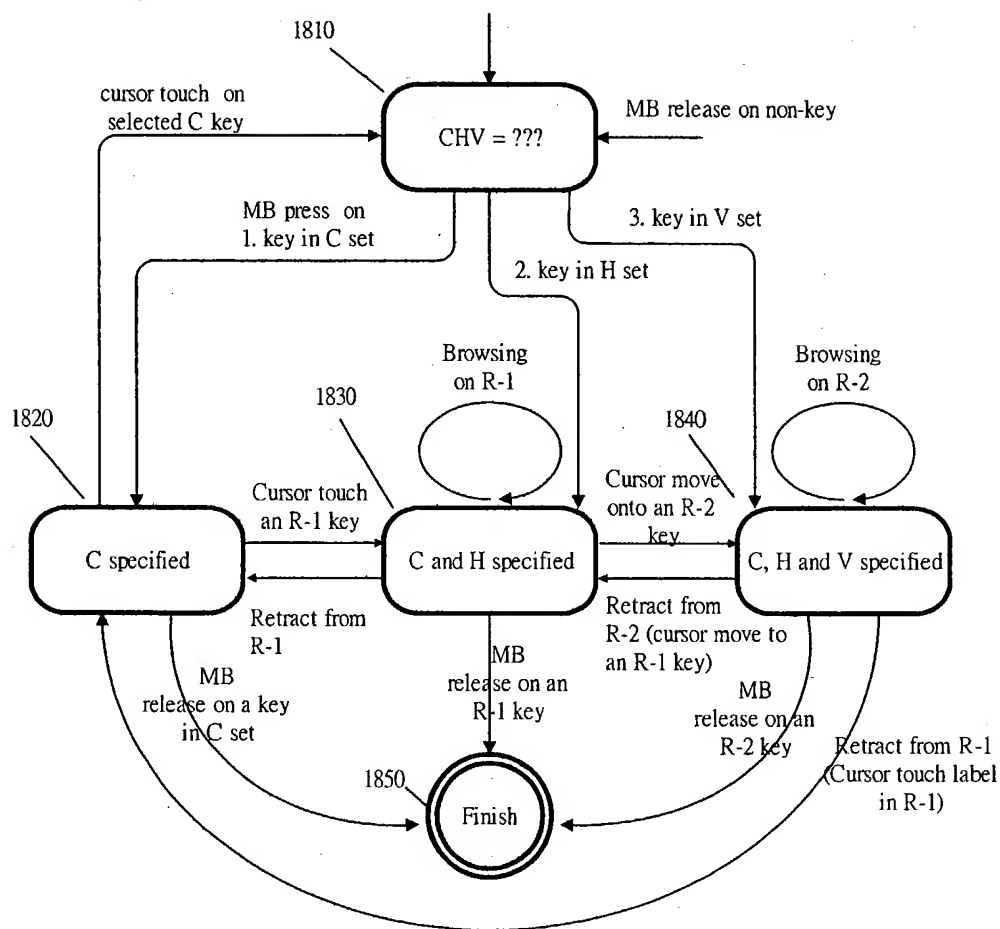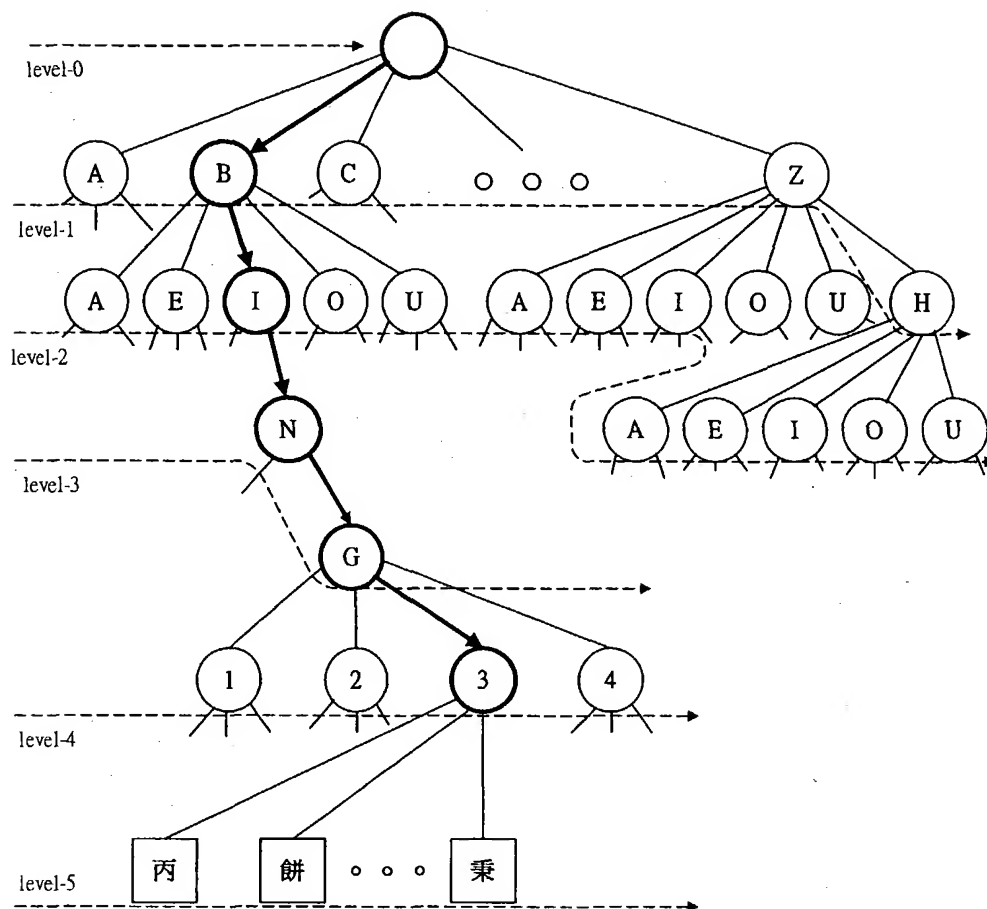
and the R-1 and R-2 window panels.

MB: Mouse Button

1810

cursor touch on
selected C key

CHV = ???

MB release on non-key

MB press on
1. key in C set

3. key in V set

2. key in H set

Browsing
on R-1

Browsing
on R-2

1820

1830

1840

Cursor touch
an R-1 key

Cursor move
onto an R-2
key

C specified

C and H specified

C, H and V specified

Retract from
R-1

Retract from
R-2 (cursor move to
an R-1 key)

MB
release on a key
in C set

MB
release on an
R-1 key

MB
release on an
R-2 key

Retract from R-1
(Cursor touch label
in R-1)

1850

Finish

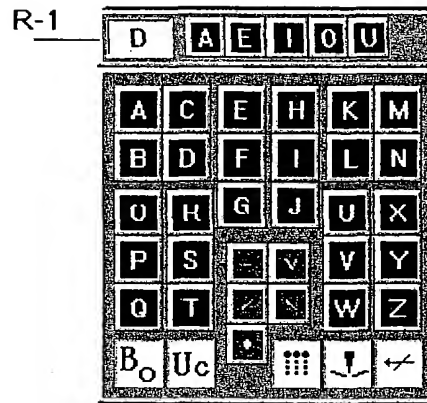Figure 18. Flow Chart of the PTR operation on the Zhu-Yin Keypad

and the R-1 and R-2 panels.

5

10

75

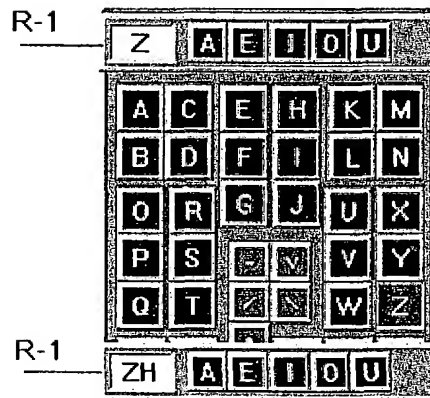Figure 19. Traversing on the Lexical Structure Tree.

(Pin-Yin system)

R-1

Figure 20. R-1 Refining Control Panel of "D".

(Pin-Yin system)

R-1

R-1

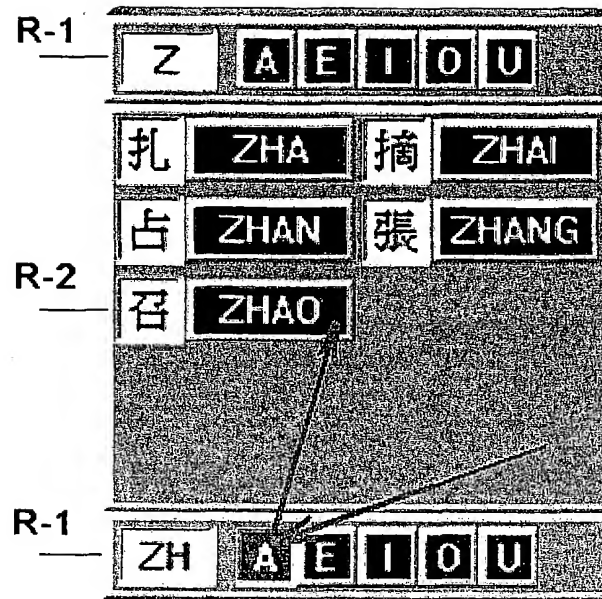Figure 21. R-1 Refining Control Panels of "Z" and "ZH".

(Pin-Yin system)

Figure 22. Press-Touch-Release operation on the Pin-Yin Keypad and the R-1 and R-2 Panels.
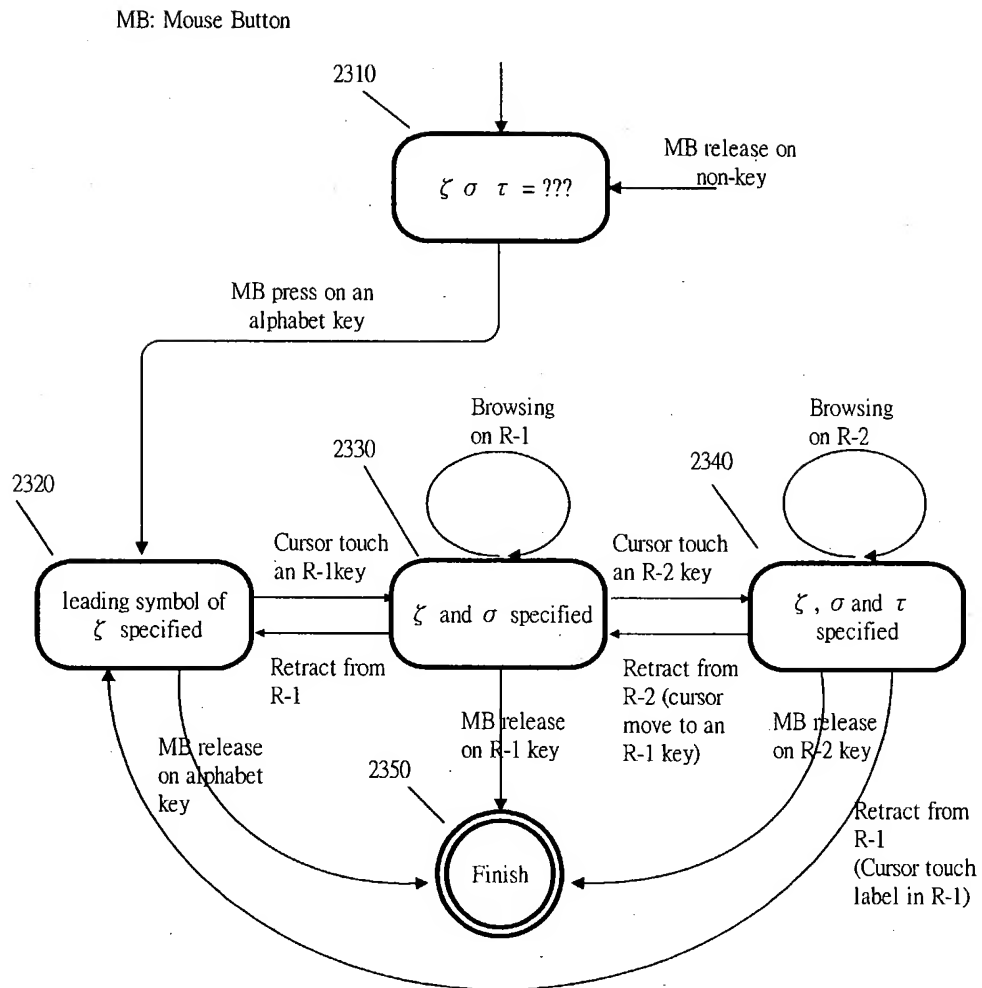
5

10

15

MB: Mouse Button

2310

$\zeta \ \sigma \ \tau \ = \ ???$

MB release on non-key

MB press on an alphabet key

Browsing on R-1

2330

Browsing on R-2

2340

2320

Cursor touch an R-1key

Cursor touch an R-2 key

leading symbol of ζ specified

ζ and σ specified

ζ, σ and τ specified

Retract from R-1

Retract from R-2 (cursor move to an R-1 key)

MB release on alphabet key

MB release on R-1 key

MB release on R-2 key

2350

Finish

Retract from R-1 (Cursor touch label in R-1)

5

Figure 23. Flow Chart of the PTR operation on the Pin-Yin Keypad

and the R-1 and R-2 panels.

10

79

most frequently
used

very frequently used

commonly used

rarely used
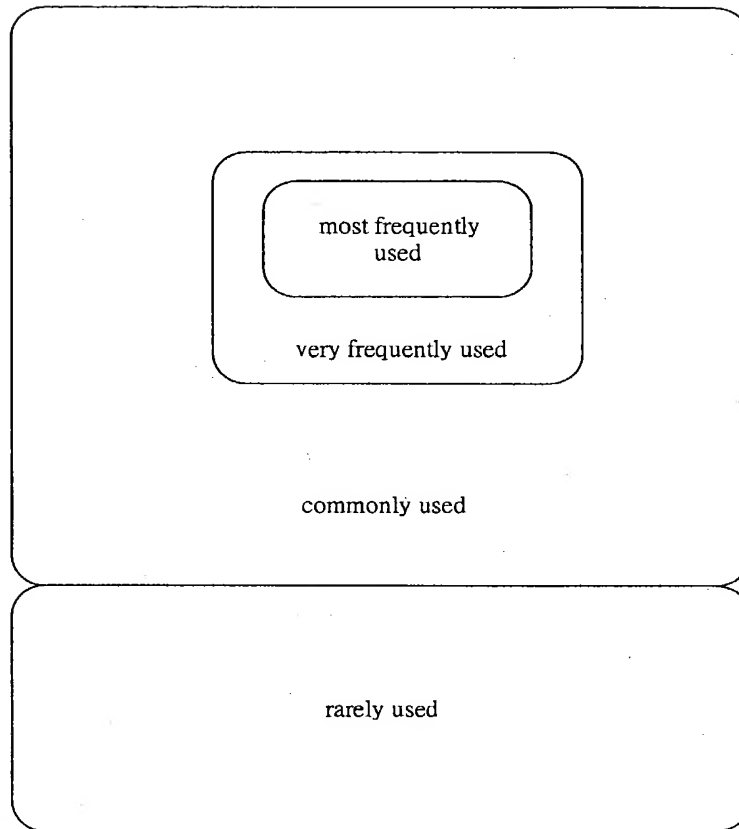
Figure 24. Multi-level frequency-based phrase classification scheme.

phrase length	1	2	3	4	5	6	7	8	9
# phrases	3700	1850	1110	740	740	370	370	370	370

5

Figure 25. The number of phrases of the very frequently used phrase set

that can be presented with a 10x10 words page in Multi-Window (Zhu-Yin system).

phrase length	1	2	3	4	5	6	7	8	9
# phrases	2600	1300	780	520	520	260	260	260	260

10

Figure 26. The number of phrases of the very frequently used phrase set

that can be presented with a 10x10 words page in Multi-Window (Pin-Yin system).
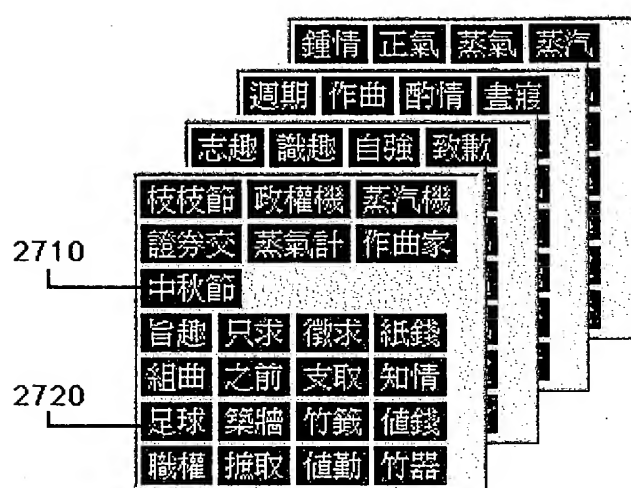
15

20

Figure 27. Varied-length phrase presentation in Multi-Window.

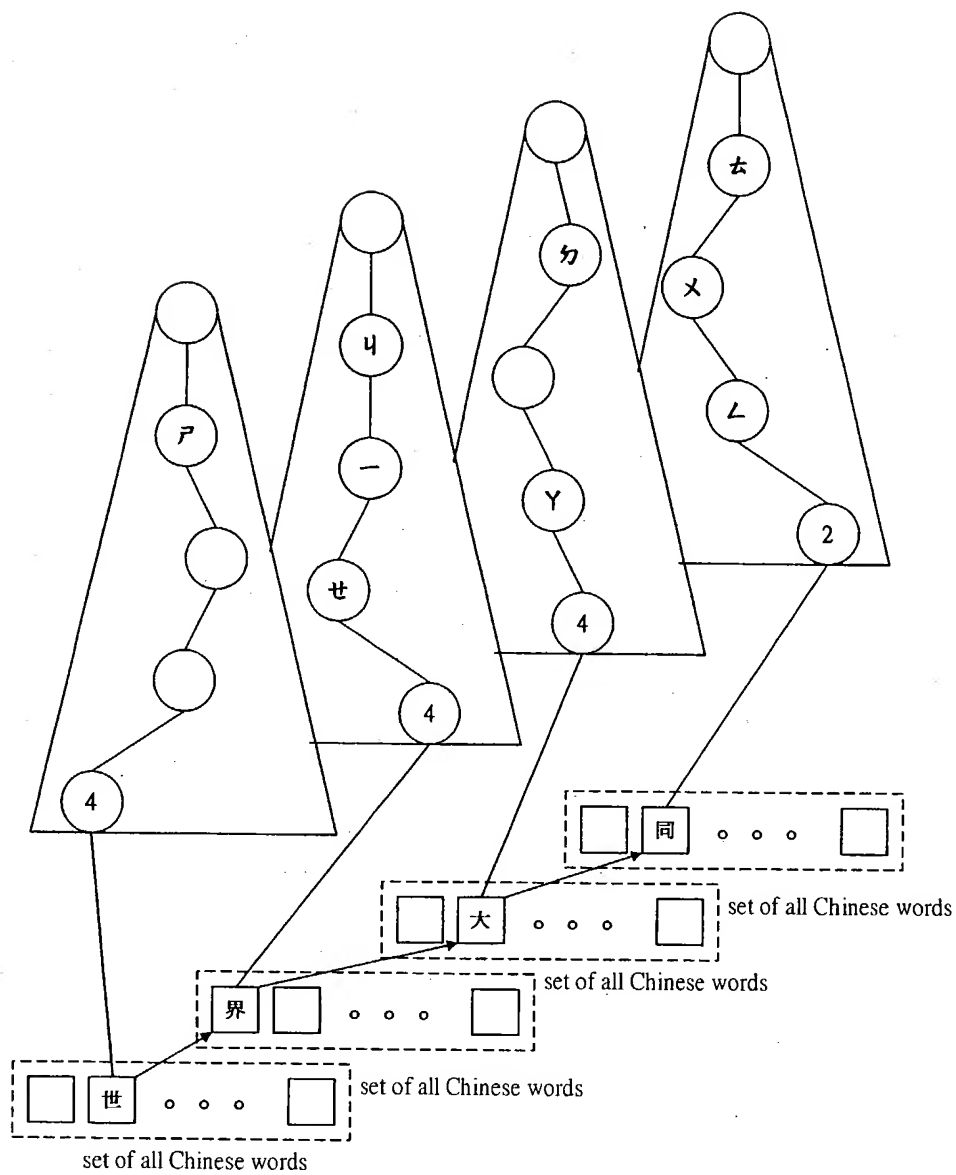Figure 28. Relation diagram between the lexical structure trees of the phonetic symbol strings and Chinese words.
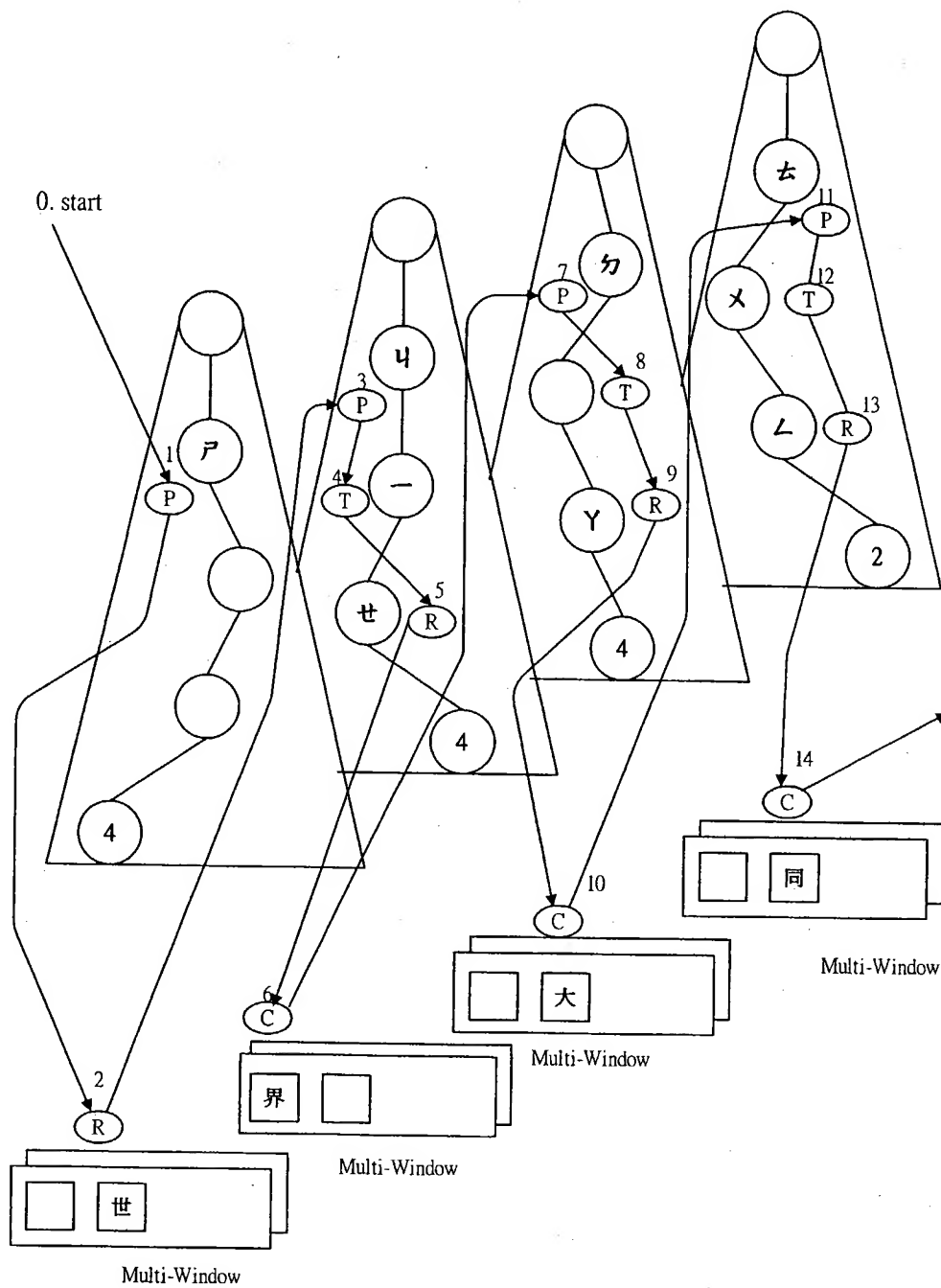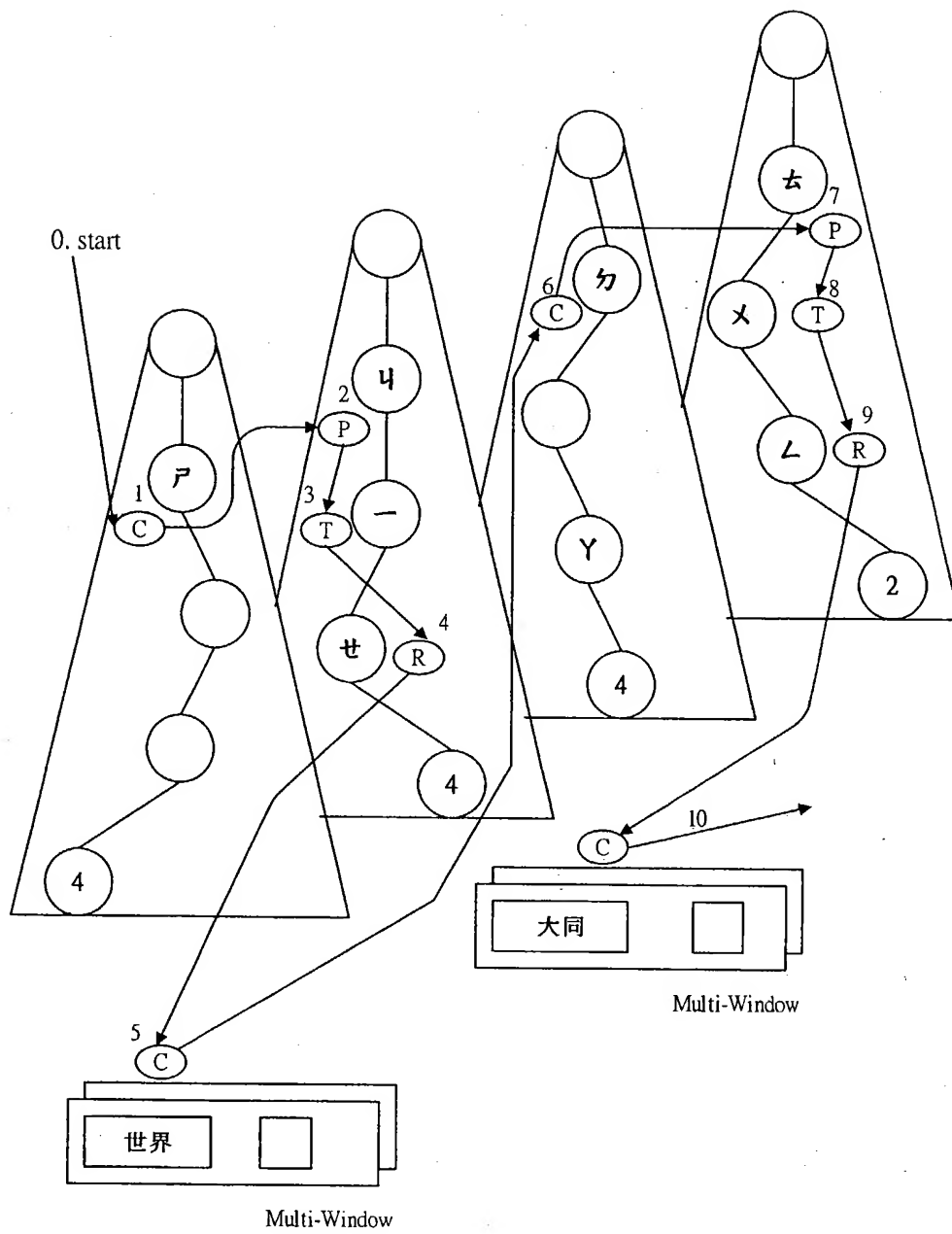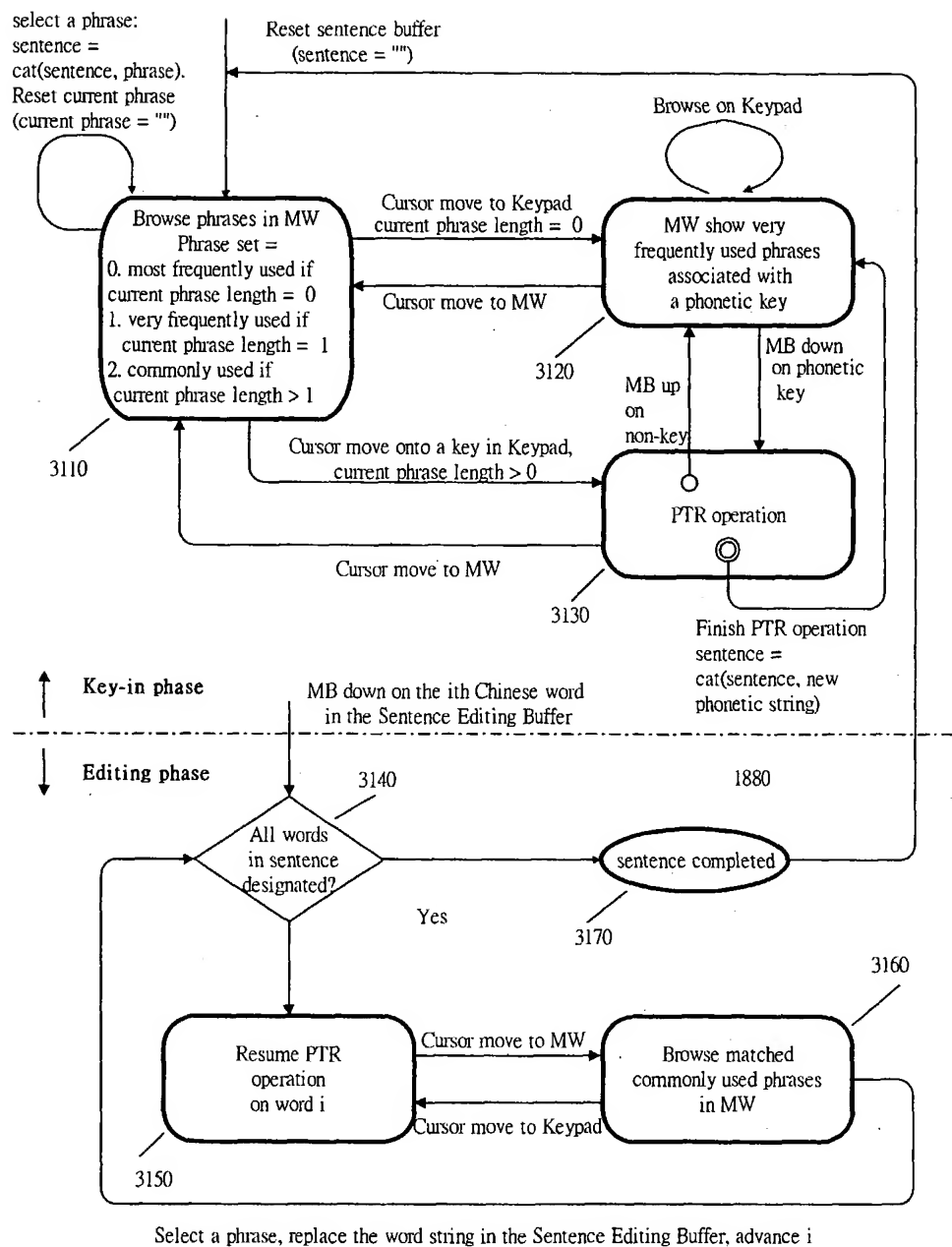
set of all Chinese words

set of all Chinese words

set of all Chinese words

set of all Chinese words

5

Figure 29. Word-by-word key-in process.

Figure 30. Phrase-by-phrase key-in process.

5

select a phrase:
sentence =
cat(sentence, phrase).
Reset current phrase
(current phrase = "")

Reset sentence buffer
(sentence = "")

Browse on Keypad

Browse phrases in MW
Phrase set =
0. most frequently used if
current phrase length = 0
1. very frequently used if
current phrase length = 1
2. commonly used if
current phrase length > 1

Cursor move to Keypad
current phrase length = 0

MW show very
frequently used phrases
associated with
a phonetic key

Cursor move to MW

3120

3110

MB down
on phonetic
key

MB up
on
non-key

Cursor move onto a key in Keypad,
current phrase length > 0

PTR operation

Cursor move to MW

3130

Finish PTR operation
sentence =
cat(sentence, new
phonetic string)

Key-in phase

MB down on the ith Chinese word
in the Sentence Editing Buffer

Editing phase

3140

1880

All words
in sentence
designated?

sentence completed

Yes

3170

3160

Resume PTR
operation
on word i

Cursor move to MW

Browse matched
commonly used phrases
in MW

Cursor move to Keypad

3150

Select a phrase, replace the word string in the Sentence Editing Buffer, advance i

Figure 31. Flow chart of the Two-Phase Sentence Generation Procedure.
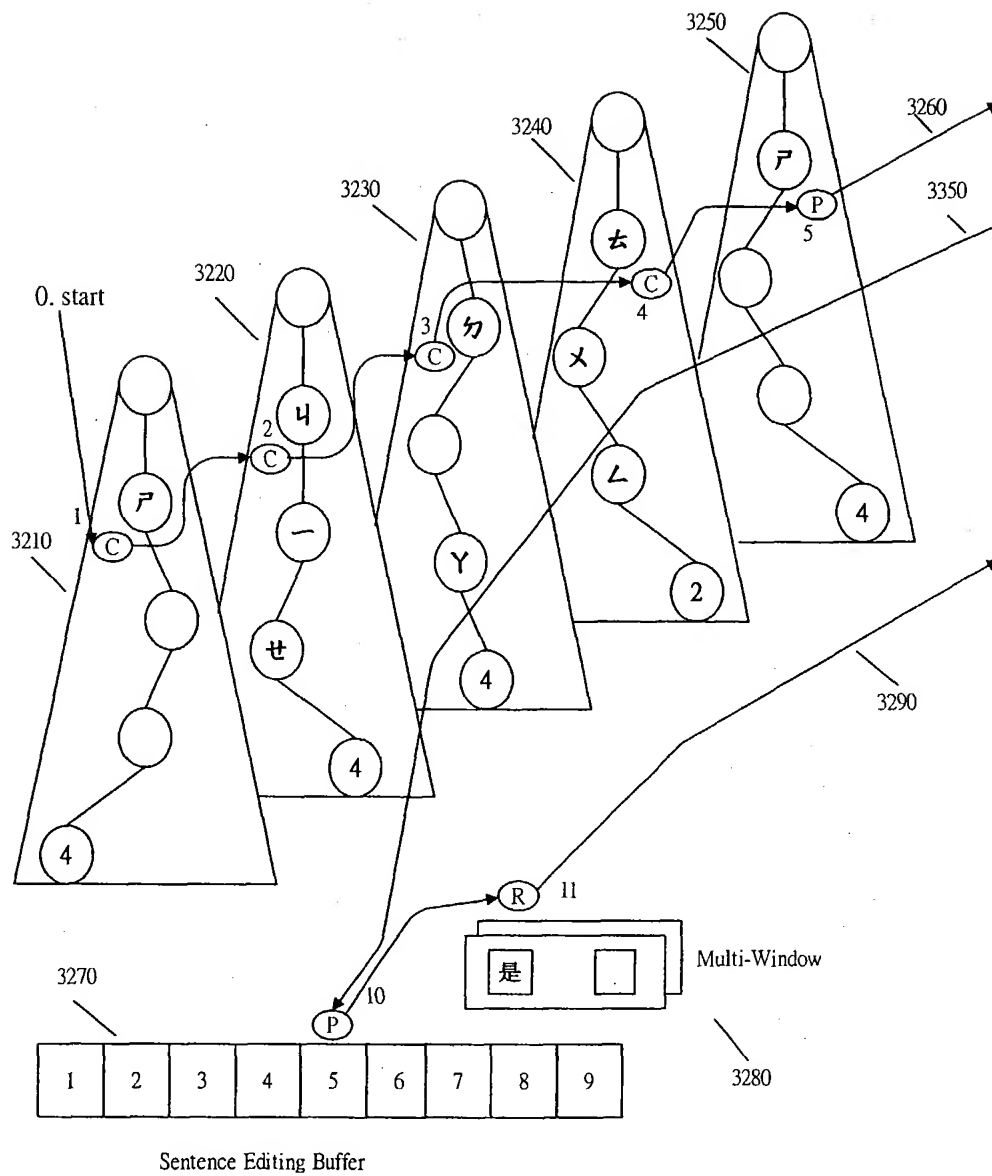
5

86

Figure 32. Example of the Two-Phase Sentence Generation Procedure
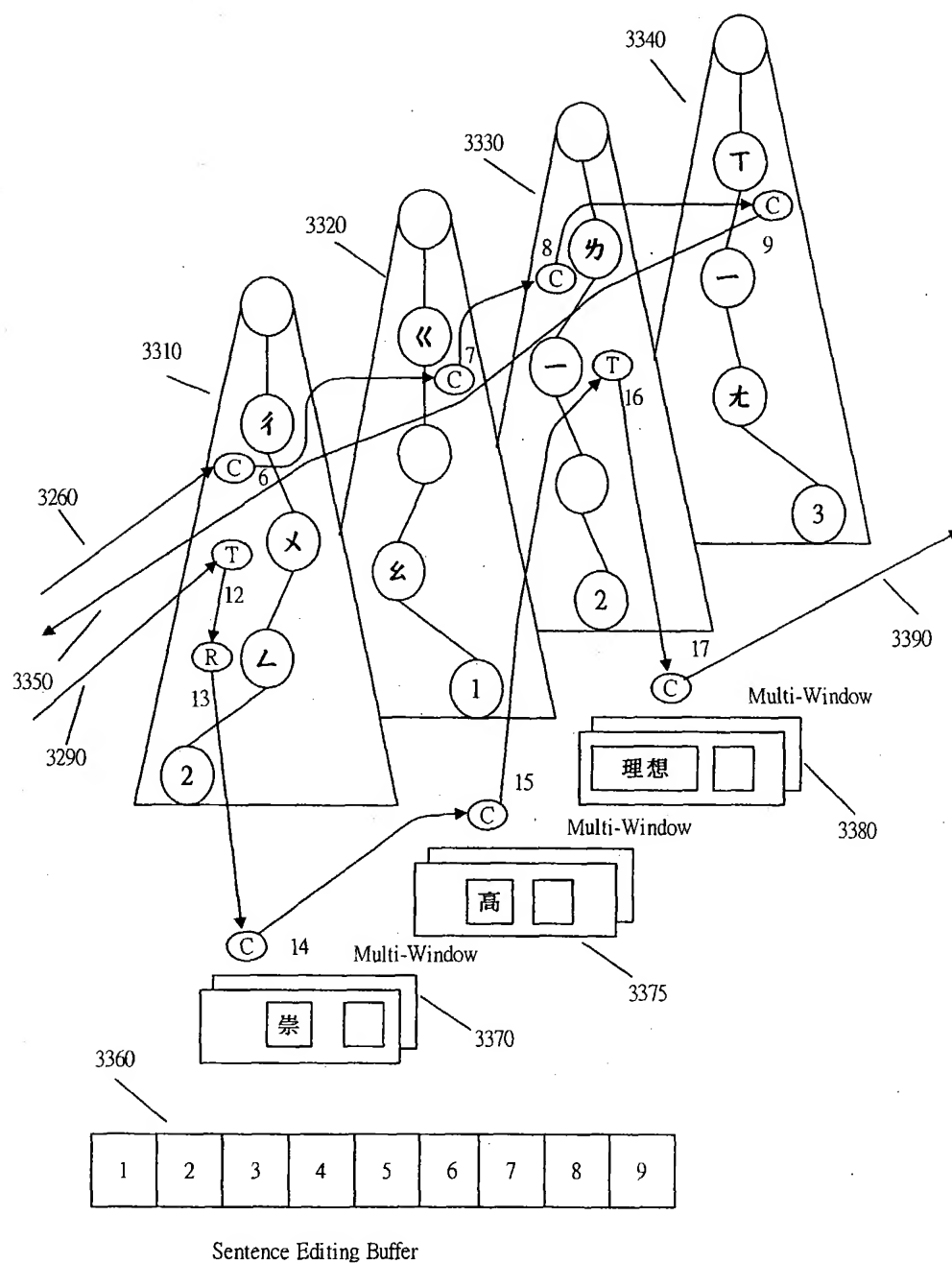
(in Rapid-Firing mode).

Figure 33. Example of the Two-Phase Sentence Generation Procedure.

(continued from Figure 32)